

Amendments to the Claims

This listing of claims replaces all prior versions, and listings, of claims in the present application.

Listing of Claims:

Claim 1 (canceled).

2. (currently amended) The secondary-battery control circuit as claimed in claim [[1]] ~~4~~, wherein said second path includes a second cutoff switch controlled independently of said first cutoff switch.

3. (original) The secondary-battery control circuit as claimed in claim 2, wherein said second cutoff switch is turned off if the voltage of said one or more secondary batteries is higher or lower than a second predetermined voltage.

4. (previously presented) A secondary-battery control circuit comprising:
a first path supplying a first load current from one or more secondary batteries connected in series or parallel, to a system, and including a first cutoff switch;
a second path supplying a second load current from said one or more secondary batteries to the system, wherein said first cutoff switch is turned off if a voltage of said one or more secondary batteries is lower than a first predetermined voltage, or if the first load current is greater than a predetermined current, thereby cutting off the first load current to the system;

a first standard-voltage generating circuit generating a first standard voltage;

a secondary-battery voltage detecting circuit detecting the voltage of said one or more secondary batteries;

a first comparing circuit comparing said first standard voltage with the voltage of said one or more secondary batteries, to detect whether said one or more secondary batteries are over-discharged;

a second standard-voltage generating circuit generating a second standard voltage;

a first voltage detecting circuit detecting a voltage corresponding to a current flowing through said one or more secondary batteries while said one or more secondary batteries are being discharged; and

a second comparing circuit comparing said second standard voltage with the voltage detected by said first voltage detecting circuit, to detect whether an excess current flows through said one or more secondary batteries,

wherein said first cutoff switch is controlled based on outputs of said first comparing circuit and said second comparing circuit.

5. (original) The secondary-battery control circuit, as claimed in claim 4, further comprising:

a third standard-voltage generating circuit generating a third standard voltage;

a third comparing circuit comparing said third standard voltage with the voltage of said one or more secondary batteries, to detect whether said one or more secondary batteries are overcharged;

a fourth standard-voltage generating circuit generating a fourth standard voltage;

a second voltage detecting circuit detecting a voltage corresponding to the current flowing through said one or more secondary batteries while said one or more secondary batteries are being charged; and

a fourth comparing circuit comparing said fourth standard voltage with the voltage detected by said second voltage detecting circuit, to detect whether the excess current flows through said one or more secondary batteries,

wherein said first cutoff switch is controlled based on outputs of said third comparing circuit and said fourth comparing circuit.

6. (currently amended) The secondary-battery control circuit as claimed in claim [[1]] 4, wherein said system, to which the second load current is supplied through said second path, includes a remaining-charge indicating IC (Integrated Circuit) used for indicating a remaining charge of said one or more secondary batteries, or a resetting IC used for resetting the system.

Claim 7 (canceled).

8 . (currently amended) The battery pack as claimed in claim [[7]] 10, wherein said second path includes a second cutoff switch controlled independently of said first cutoff switch.

9. (original) The battery pack as claimed in claim 8, wherein said second cutoff switch is turned off if the voltage of said one or more secondary batteries is higher or lower than a second predetermined voltage.

10. (previously presented) A battery pack, comprising:

one or more secondary batteries connected in series or parallel; and

a secondary-battery control circuit, wherein said secondary-battery control circuit includes:

a first path supplying a first load current from said one or more secondary batteries to a system, and including a first cutoff switch;

a second path supplying a second load current from said one or more secondary batteries to the system, wherein said first cutoff switch is turned off if a voltage of said one or more secondary batteries is lower than a first predetermined voltage, or if the first load current is greater than a predetermined current, thereby cutting off the first load current to the system;

a first standard-voltage generating circuit generating a first standard voltage;

a secondary-battery voltage detecting circuit detecting the voltage of said one or more secondary batteries ;

a first comparing circuit comparing said first standard voltage with the voltage of said one or more secondary batteries, to detect whether said one or more secondary batteries are over-discharged;

a second standard-voltage generating circuit generating a second standard voltage;

a first voltage detecting circuit detecting a voltage corresponding to a current flowing through said one or more secondary batteries while said one or more secondary batteries are being discharged; and

a second comparing circuit comparing said second standard voltage with the voltage detected by said first voltage detecting circuit, to detect whether an excess current flows through said one or more secondary batteries,

wherein said first cutoff switch is controlled based on outputs of said first comparing circuit and said second comparing circuit.

11. (original) The battery pack, as claimed in claim 10, wherein said secondary-battery control circuit further includes:

a third standard-voltage generating circuit generating a third standard voltage;

a third comparing circuit comparing said third standard voltage with the voltage of said one or more secondary batteries, to detect whether said one or more secondary batteries are overcharged;

a fourth standard-voltage generating circuit generating a fourth standard voltage;

a second voltage detecting circuit detecting a voltage corresponding to the current flowing through said one or more secondary batteries while said one or more secondary batteries are being charged; and

a fourth comparing circuit comparing said fourth standard voltage with the voltage detected by said second voltage detecting circuit, to detect whether the excess current flows through said one or more secondary batteries,

wherein said first cutoff switch is controlled based on outputs of said third comparing circuit and said fourth comparing circuit.

12. (currently amended) The secondary-battery control circuit as claimed in claim [[7]] 10, wherein said system, to which the second load current is supplied through said second path, includes a remaining-charge indicating IC (Integrated

Circuit) used for indicating a remaining charge of said one or more secondary batteries, or a resetting IC used for resetting the system.

Claim 13 (canceled).

14. (currently amended) The portable device as claimed in claim ~~[[13]]~~ 16, wherein said second path includes a second cutoff switch controlled independently of said first cutoff switch.

15. (original) The portable device as claimed in claim 14, wherein said second cutoff switch is turned off if the voltage of said one or more secondary batteries is higher or lower than a second predetermined voltage.

16. (previously presented) A portable device comprising:

a battery pack that includes one or more secondary battery connected in series or parallel, and a secondary-battery control circuit; and

a load circuit supplied with a load current from said battery pack,

wherein said secondary-battery control circuit includes:

a first path supplying a first load current from one or more secondary batteries connected in series or parallel to a system, and including a first cutoff switch; and

a second path supplying a second load current from said one or more secondary batteries to the system, wherein said first cutoff switch is turned off if a voltage of said one or more secondary batteries is lower than a first predetermined voltage, or if the first load current is greater than a predetermined current, thereby cutting off the first load current to the system;

a first standard-voltage generating circuit generating a first standard voltage;

a secondary-battery voltage detecting circuit detecting the voltage of said one or more secondary batteries;

a first comparing circuit comparing said first standard voltage with the voltage of said one or more secondary batteries, to detect whether said one or more secondary batteries are over-discharged;

a second standard-voltage generating circuit generating a second standard voltage;

a first voltage detecting circuit detecting a voltage corresponding to a current flowing through said one or more secondary batteries while said one or more secondary batteries are being discharged; and

a second comparing circuit comparing said second standard voltage with the voltage detected by said first voltage detecting circuit, to detect whether an excess current flows through said one or more secondary batteries,

wherein said first cutoff switch is controlled based on outputs of said first comparing circuit and said second comparing circuit.

17. (original) The portable device, as claimed in claim 16, wherein said secondary-battery control circuit further includes:

a third standard-voltage generating circuit generating a third standard voltage;

a third comparing circuit comparing said third standard voltage with the voltage of said one or more secondary batteries, to detect whether said one or more secondary batteries are overcharged;

a fourth standard-voltage generating circuit generating a fourth standard voltage;

a second voltage detecting circuit detecting a voltage corresponding to the current flowing through said one or more secondary batteries while said one or more secondary batteries are being charged; and

a fourth comparing circuit comparing said fourth standard voltage with the voltage detected by said second voltage detecting circuit, to detect whether the excess current flows through said one or more secondary batteries,

wherein said first cutoff switch is controlled based on outputs of said third comparing circuit and said fourth comparing circuit.

18. (currently amended) The portable device as claimed in claim ~~[[13]]~~ 16, wherein said system, to which the second load current is supplied through said second path, includes a remaining-charge indicating IC (Integrated Circuit) used for indicating a remaining charge of said one or more secondary batteries, or a resetting IC used for resetting the system.

19. (new) The secondary-battery control circuit as claimed in claim 4, wherein said first cutoff switch comprises a plurality of transistors.

20. (new) The battery pack as claimed in claim 10, wherein said first cutoff switch comprises a plurality of transistors.

21. (new) The portable device as claimed in claim 16, wherein said first cutoff switch comprises a plurality of transistors.